

## US082-SSC3224EVZ

Evaluation Board for High-End 24-Bit Sensor Signal Conditioner

# Introduction

This document provides quick-start instructions for the US082-SSC3224EVZ board, including setting up and programming the board.

*Important*: To ensure correct setup of the US082-SSC3224EVZ board, complete the steps in the order listed in Quick Start Procedure.

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## 1. Board Information

Visit the <u>US082-SSC3224EVZ</u> product page for more information about the board and how to acquire the product.

## 1.1 Acquiring the Board



Figure 1. US082-SSC3224EVZ Board

Part Number	Description
US082-SSC3224EVZ	High-End 24-Bit Sensor Signal Conditioner Evaluation Board

### 1.2 Board Contents

The US082-SSC3224EVZ board integrates the ZSSC3224, a high-precision sensor signal conditioning IC designed for high-resolution sensor module applications. The ZSSC3224 can perform offset, span, and 1st and 2nd order temperature compensation of the measured signal. Developed for correction of resistive bridge or absolute voltage sensors, it can also provide a corrected temperature output measured with an internal sensor.



Figure 2. US082-SSC3224EVZ Block Diagram

R1: 1.6kΩ, R2: 4.2kΩ, POT: 10kΩ

#### 1.2.1 Hardware Requirements

To setup and configure the US082-SSC3224EVZ board, the following hardware is recommended or required:

- EK-RA6M4
- USB micro-B cable (provided with the EK-RA6M4)
- PC running Windows 10/11 with at least one USB port
- Potentiometer (this demo uses a 10kΩ POT)
- <u>SSC Communication Board</u> (for calibration)
- <u>US082-SSCALINTRPEVZ</u> (for calibration)
- US082-INTERPEVZ
- Resistors for sensor bridge

#### 1.2.2 Software Requirements

The following software is required or recommended:

- <u>e<sup>2</sup> Studio</u> 2024-01 or later
  - RA Flexible Software Package (FSP) 5.0.0 or later
  - GCC Arm Embedded 13.2.1.arm-13-7
  - Sample code files (available on the <u>US082-SSC3224EVZ</u> product page)
- J-Link RTT Viewer
- ZSSC3224 Evaluation Software (available on the <u>ZSSC3224</u> product page)

# 2. Calibration Procedure

Follow the calibration procedure steps in the evaluation kit manual available on the <u>ZSSC3224</u> product page.

## 3. Sensor Bridge Configuration

For this demo, the sensor bridge is wired as shown in Figure 2.

## 4. Quick Start Procedure

Complete the following quick-start procedure steps in the order listed.

### 4.1 Install e<sup>2</sup> Studio

Install the latest version of the e<sup>2</sup> Studio and the RA Flexible Software Package (FSP).

### 4.2 Kit Hardware Connection

Use the following steps to set up the kit's hardware connections.

1. Ensure that the MCU development kit has at least one Type 6A Pmod.

- a. For the EK-RA6M4, if no Type 6A Pmod is available, ensure that the kit can use the US082-INTERPEVZ interposer board. Insert the board into the MCU connector before adding any sensor boards.
- 2. Mount the J5, J6, and J7 jumpers on the US082-SSC3224EVZ.
- 3. Setup a sensor bridge as shown in Figure 2.
- 4. Connect the sensor bridge to the US082-SSC3224EVZ as shown in Figure 3.



Figure 3. Sensor Bridge Setup



- 5. Plug the US082-SSC3224EVZ board into the US082-INTERPEVZ on the PMOD1 connector. Ensure all pins are properly aligned (see Figure 4).
- 6. Connect the EK-RA6M4 to the computer using the USB micro-B cable.

The kit is now ready to use.



Figure 4. US082-SSC3224EVZ with EK-RA6M4 MCU Kit



## 5. Board Testing

### 5.1 Programming the Renesas Development Board

1. Open the sample project in e<sup>2</sup> studio.



Figure 5. ZSSC3224 Project Structure

2. Click the Build icon.





3. From the menu bar, select  $\mathbf{Run} \rightarrow \mathbf{Debug}$  Configurations.



- 4. Select Renesas DGB Hardware Debugging → ZSSC3224\_Demo\_Debug\_Flat (see Figure 8).
- 5. Click the **Debug** button.

🖻 闷 🗎 🗶 🖻 🍸 🗸	Name: ZSSC3224_Demo Debug_Flat			
pe filter text	📄 Main 🏇 Debugger 🕨 Startup 🔲 Common	🥪 Source		
C/C++ Application	Project:			
C/C++ Remote Application	ZSSC3224 Demo			Browse
GDB Hardware Debugging	C/C++ Application:			
GDB Simulator Debugging (F	Debug/ZSSC3224_Demo.elf			
Renesas GDB Hardware Debu		Variables	Search Project	Browse
ek_ra6m4_sensorzssc3224	Build (if required) before launching			
ek_ra6m4_sensorzssc324(	Ruild Configuration: Lice Active			
C* ZSSC3224 Demo Debug	Ose Active	0.00		
ZSSC3240_Demo Debug_	O Enable auto build	<ul> <li>Disable auto</li> </ul>	build	
💽 Renesas Simulator Debuggin	Use workspace settings	Configure Work	space Settings	
,			Revert	Apply

Figure 8. Start Debug Mode

6. Click the **Play** button to run the code.



Figure 9. Running the Code

#### 5.2 Using RTT Viewer

- 1. Close  $e^2$  studio.
- 2. Open the J-Link RTT Viewer (see Figure 10).
- 3. Unplug the EK-RA6M4 from your PC, then plug it back in.
- 4. Press **S3** on the EK-RA6M4.
- 5. Click File  $\rightarrow$  Connect

L.	J-Link RTT V	/iewer V	7.96i									_		$\times$
File	Terminals	Input	Logging	Help										
	Connect	F2												
	Disconnect	F3												
	Exit	Alt+	F4											
_	Stay on Top	)												
												Enter	Cle	ear
LOC	: [1][2]	: E006	2000 CI	D 8105900D	PID 00088D21	DEVARCH 47701A	03 DEVTY	PE 00 FPB						^
LOG	: [1][3] : [1][5]	: E000	1000 CI	D B105900D	PID 00088D21 PID 00288D21	DEVARCH 47701A	13 DEVTY	PE 43 11M PE 13 ETM						
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LOG	: All Te	rminal	s tab c	leared.										
														~
RTT \	/iewer discon	nected.								2	77.810 KB			

Figure 10. RTT Viewer

- 6. Ensure your configuration matches the configuration shown in Figure 11.
  - a. Search Range: 0x2000000 0x8000.
- 7. Click OK.

Connection to J-Link USB TCP/IP Switching Section	Serial No		
TCP/IP  Evicting Cossion			
Evisting Section			
C Existing Session			
Specify Target Device			
R7FA6M4AF		~	
Force go on connect			
Script file (optional)			
Target Interface & Speed			
JTAG	•	4000 kH	z •
JTAG scan chain informa	tion		
Auto detection			
<ul> <li>Simple configuration</li> </ul>	n		
RTT Control Block			
○ Auto Detection ○ A	ddress 💿	Search F	Range
Enter one or more address Syntax: <rangestart [hex<br="">Example: 0x1000000 0x1</rangestart>	s range(s) the RTT ]> <rangesize>[, 1000, 0x2000000</rangesize>	Control <range 0x1000</range 	block ( 1Start
0x20000000 0x8000			
	ОК	Can	cel

Figure 11. RTT Viewer Options

8. As you rotate the potentiometer you should see the following output in the "All Terminals" tab.

```
🔜 J-Link RTT Viewer V7.96i
File Terminals Input Logging Help
 All Terminals
            Terminal 0
             **ZSSC3224 Sensor Data**
 00>
00>
00>
      Temperature
                        = 67.61 (F)
00>
    ********ZSSC3224 Sensor Data*********
00>
00>
00>
    Temperature = 67.64 (F)
Sensor Reading = 57.57%
00>
00>
00>
00>
    *********ZSSC3224 Sensor Data*********
00>
00>
                        = 67.64 (F)
      Temperature
      Sensor Reading = 40
                       = 40.69%
00>
                                *<u>*</u>*********
00>
00>
    ********ZSSC3224 Sensor Data********
00>
00>
    Temperature = 67.68 (F)
Sensor Reading = 25.18%
00>
00>
00>
00>
00>
    ********ZSSC3224 Sensor Data********
00>
      Temperature
                        = 67.74 (F)
00>
                          14.84%
00>
      Sensor Reading
```

Figure 12. Demo Output

# 6. Revision History

Revision	Date	Description
1.00	Jul 2, 2025	Initial release.



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